

IN THE CLAIMS:

Please replace the claims with the claims provided in the listing below wherein status, amendments, additions and cancellations are indicated.

1 - 8 (Canceled).

9. (New) A device for supporting a worm shaft in a housing, said housing including a drive source, said worm shaft including first and second opposing ends, said first end connecting to said drive source, said device comprising:

a first ball bearing being a deep-groove ball bearing, said bearing including an inner ring, an outer ring, and a bearing ball, said inner ring and said outer ring each including a racetrack groove, said first bearing connecting said first end of said worm shaft to said drive source wherein:

said inner ring racetrack groove includes a curvature radius of between 52.5% and 75% of the diameter of said ball; or

said outer ring racetrack groove includes a curvature radius of between 53.5% and 85% of the diameter of said ball.

10. (New) The worm support device of claim 9, wherein said housing includes an inner peripheral surface, and wherein:

said inner ring of said first ball bearing tightly fits against said worm shaft;

said device including a second ball bearing, said second ball bearing supporting said second end of said worm shaft; and

said second bearing fitting against said second end of said worm shaft so that said bearing moves relative to one of said second end of said worm shaft or said inner peripheral surface of said housing.

11. (New) The worm support device of claim 10, wherein said first bearing includes a negative gap.

12. (New) A power assist unit for providing steering assist power to a wheel steering mechanism, the steering mechanism including a steering shaft, said power assist unit comprising:

a motor including an output shaft, said motor providing rotational motion; and

a worm gear mechanism for reducing the rotation power and outputting the rotation power as said steering assist power;

said worm gear mechanism further comprising:

a housing connecting to said motor;

a worm disposed within said housing, said worm including first and second shaft ends, said first shaft end connecting to the output shaft of said motor, said worm including a gear section;

a worm wheel engaged with said worm gear section, said worm wheel being connected to the steering shaft;

first and second bearings disposed in said housing, said first bearing supporting said first shaft end of said worm and said second bearing supporting said second shaft end of said worm; and

said first bearing being a deep-groove ball bearing, said bearing including an inner ring, an outer ring, and a bearing ball, said inner ring and said outer ring each including a racetrack groove, wherein:

said inner ring racetrack groove includes a curvature radius of between 52.5% and 75% of the diameter of said ball; or

said outer ring racetrack groove includes a curvature radius of between 53.5% and 85% of the diameter of said ball.

13. (New) The power assist unit of claim 12, wherein said housing includes an inner peripheral surface, and wherein:

said inner ring of said first ball bearing tightly fits against said worm shaft;
and

said second bearing fitting against said second end of said worm shaft so that said bearing moves relative to one of said second end of said worm shaft or said inner peripheral surface of said housing.

14. (New) The power assist unit of claim 13, wherein:

said inner peripheral surface of said housing includes a large-diameter section surrounding said first shaft end of said worm and a small-diameter section surrounding said second shaft end of said worm, said large and small diameter sections being separated by a step in said inner peripheral surface of said housing;

said power assist unit further comprising a threaded lid, said threaded lid being threaded into the large-diameter section of said housing; and

said outer ring of said first bearing being loosely fit against said large-diameter section of said housing, and said outer ring being axially disposed between said step in said inner peripheral surface and said threaded lid.

15. (New) The power assist unit of claim 12, wherein the outer ring of said second bearing being press fit into said small-diameter section, said outer ring being axially disposed therein and the inner ring of the second bearing is joined by loose fitting into the shaft portion of said worm.

16. (New) The power assist unit of claim 12, wherein:

the raceway groove of the inner ring of said first bearing includes a composite curve surface, said composite curve defining opposing shoulder regions and a bottom region, each region including a curvature radius; and

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said curvature radius of said shoulder regions being smaller than said curvature radius of said bottom region.